

Additional Notes on the Insects Occurring on Mauna Kea and Mauna Loa.

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The island of Hawaii presents an excellent opportunity to the entomologist to study insect life under extreme conditions. Making his headquarters at Kilauea, he may visit a xerophytic desert in Kau, luxuriant fern thickets in the Fern Forest, rich pockets in the smaller craters, native forests, or the barren lava slopes of upper Mauna Loa, 10,000 to 13,000 feet elevation, almost within a day's tramp.

In 1922 (Proc. Haw. Ent. Soc., V, p. 287) I called attention to several records of insects collected at high elevation on Mauna Loa, and recorded several species collected by W. H. Meinecke on the summit of Mauna Kea, elevation 13,825 feet. This past August I had the privilege of accompanying Mr. Meinecke to the top of Mauna Loa, and spending two days in the crater of Mokuaweoweo, about 13,000 feet elevation. Shortly afterward Mr. Meinecke again ascended Mauna Kea, capturing a number of specimens. Thus a few additional records are added to our knowledge of the insects occurring at these high elevations.

The quantity of insects occurring in such a barren place as Mokuaweoweo Crater was a great surprise. Except for a very few small moss plants tucked away in moist cracks, the crater is entirely bare of vegetation. In fact almost nothing grows above 10,000 feet, and very little above 8000. The last plants we encountered were small scrubby "puakeawe" (*Styphelia Tameiameia*) near Red Hill. Yet flying about or resting on bare lava boulders were numbers of flies of several species, and even butterflies and micro moths. When the sun shone they were lively, but when it went behind a cloud they became sluggish, for even at noontime in August the air is chilly. They were so lively that without a net I was unable to catch all the different species seen. Pursuit was difficult over the rough lava.

The most abundant fly in the crater was *Limnophora arcuata*

Stein. Curiously enough this fly has only been known in the Islands for three years, having been first captured here in 1922. It is now widely distributed throughout the group. Mr. Swezey informs me that it is also abundant in the interior of Kauai. This small anthomyid hovers in the air, and is readily recognized by the four conspicuous dark spots on the abdomen. All the other flies captured have already been reported, but a specimen of *Agromyza pusilla* Meigen settled on my hand long enough to be recognized, and I also saw a small gnat.

Two butterflies, besides the already reported *Pontia rapae*, were captured or seen: *Vanessa cardui* Linn, and *Lycaena boetica* (Linn.). Both were in the crater, and both lively.

It was a surprise to have a specimen of the common pentatomid, *Oechalia griseus* Burm. settle on us while resting at about 13,200 feet elevation. Mr. Meinecke caught another specimen at Kalaieha, on the south slope of Mauna Kea, at some 6400 feet lower elevation.

On Mauna Kea, Mr. Meinecke caught the usual *Amblyteles koebelei* (Swezey); *Chaetogaedia monticola* (Bigot); *Simosyrphus grandicornis* (Macquart); *Sarcophaga pallinervis* Thomson; *Euxoa austalea* (Meyr.); *Scotorythra rara* (But.); *Scotorythra arurea* (Meyr.), and two other rubbed specimens of moths; and a specimen of *Plagithmysus blackburni* (Sharp) caught on Mamani (*Sophora chysophylla* Seem.); also a specimen of *Agrotiphila microreus* (Meyr.) from Ainahou, 6000 feet.

It is interesting to note that, with a few exceptions, the same species of insects are captured each time from both Mauna Kea and Mauna Loa. These species are undoubtedly blown up by the wind from lower elevations. The following is a list of the species positively recorded from these higher elevations on Hawaii:

SPECIES FOUND AT HIGH ELEVATIONS ON HAWAII.

Hymenoptera.

- Amblyteles koebelei* (Swezey), Mauna Loa, Mauna Kea.
- Bassus laetatorius* (Fabr.), Mauna Loa, Mauna Kea.
- Echthromorpha fusco-orbitalis* (Cam.), Mauna Kea.
- Limnerium blackburni* Cam., Mauna Loa, Mauna Kea.
- Psammochares luctuosus* (Cr.), Mauna Loa.

Coleoptera.

Plagithmysus blackburni (Sharp), Mauna Loa, Mauna Kea
(on Mamani).

Scymnus notescens (Blackburn), Mauna Loa.

Diptera.

Simosyrphus (Xanthogramma) grandicornis (Macq.), Mauna
Loa, Mauna Kea.

Frontina archippivora Williston, Mauna Loa, Mauna Kea.

Chaetogaedia monticola (Bigot), Mauna Kea.

Sarcophaga pallinervis Thomson, Mauna Loa, Mauna Kea.

Haematobia irritans (Linn.), Mauna Loa.

Limnophora arcuata Stein, Mauna Loa.

Borborus sp., Mauna Loa.

Agromyza pusilla Meigen, Mauna Loa (seen).

Hemiptera.

Oechalia griseus (Burm.), Mauna Loa.

Nysius delectus White, Mauna Loa.

Nysius coenosulus White, Mauna Loa.

Lepidoptera.

Vanessa cardui (Linn.), Mauna Loa.

Pontia rapae (Linn.), Mauna Loa, Mauna Kea.

Lycaena boetica Linn., Mauna Loa.

Euxoa austalea (Meyrick), Mauna Kea.

Scotorythra rara (Butl.), Mauna Loa, Mauna Kea.

Scotorythra aruraea Meyrick, Mauna Kea.

Eccoptyocera foetorivorans (Butl.), Mauna Loa.

Odonata.

Anax junius Drury, Mauna Loa.